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TRANSMITTAL FORM

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Application Number	09/542,782
Filing Date	April 4, 2000
First Named Inventor	Joseph R. Little
Group Art Unit	2878
Examiner Name	S. Yam
Attorney Docket Number	2269-4298US

ENCLOSURES *(check all that apply)*

- ☒ Postcard receipt acknowledgment (attached to the front of this transmittal)
- ☒ Duplicate copy of this transmittal sheet in the event that additional filing fees are required under 37 C.F.R. § 1.16
- ☐ Preliminary Amendment
- ☐ Response to Restriction Requirement/Election of Species Requirement dated
- ☐ Amendment in response to office action dated
- ☐ Amendment under 37 C.F.R. § 1.116 in response to final office action dated
- ☐ Additional claims fee - Check No. in the amount of $
- ☐ Letter to Chief Draftsman and copy of FIGS. with changes made in red
- ☐ Transmittal of Formal Drawings
- ☐ Formal Drawings (sheets)
- ☐ Information Disclosure Statement, PTO/SB/08A; ☐ copy of cited references
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Remarks

The Commissioner is authorized to charge any additional fees required but not submitted with any document or request requiring fee payment under 37 C.F.R. §§ 1.16 and 1.17 to Deposit Account 20-1469 during pendency of this application.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm *or* Individual name	Brick G. Power — Registration No. 38,581
Signature	Brick G. Power
Date	January 18, 2005

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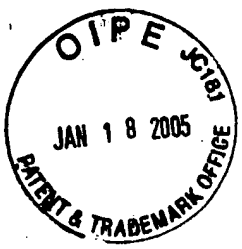

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Joseph R. Little

Serial No.: 09/542,782

Filed: April 4, 2000

For: APPARATUS AND METHOD FOR FEATURE EDGE DETECTION IN SEMICONDUCTOR PROCESSING

Confirmation No.: 6869

Examiner: S. Yam

Group Art Unit: 2878

Attorney Docket No.: 2269-4298US

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APPEAL BRIEF

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P.O. Box 1450
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Attn: Board of Patent Appeals and Interferences

Sir:

This Appeal Brief is being submitted in the format required by 37 C.F.R. § 41.37(c)(1), with the fee required by 37 C.F.R. § 41.20(b)(2).

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I. REAL PARTY IN INTEREST

U.S. Application Serial No. 09/542,782 (hereinafter "the '782 Application"), the application at issue in the above-referenced appeal, has been assigned to Micron Technology, Inc., as evidenced by the assignment that has been recorded with the U.S. Patent & Trademark Office (hereinafter "the Office") at Reel No. 010729, Frame No. 0833. Accordingly, Micron Technology, Inc., is the real party in interest in the above-referenced appeal.

II. RELATED APPEALS AND INTERFERENCES

Neither Appellant nor the undersigned attorney is currently aware of any appeals or interference proceedings that would affect or be affected by the Board's decision in the above-referenced appeal.

III. STATUS OF CLAIMS

Claims 1-60 are currently pending and under consideration in the '782 Application.

Claims 1-60 stand rejected. The rejections of claims 1-60 are being appealed.

IV. STATUS OF AMENDMENTS

The '782 Application was filed with sixty (60) claims on April 4, 2000.

A Preliminary Amendment was mailed on January 12, 2001, to correct errors in the specification and claims.

On March 13, 2003, a first Office Action was mailed. All of the claims were rejected.

A Response followed on June 13, 2003. In the response, claims 41 and 59 were amended.

In a Final Office Action dated August 21, 2003, the Examiner maintained his prior grounds of rejection against claims 1-60.

On October 21, 2003, an Amendment Under 37 C.F.R. § 1.116 was filed. In that Amendment, revisions to all of the claims were proposed, as was reasoning as to the patentability of each of claims 1-60 over the art upon which the rejections were based.

An Advisory Action followed on November 26, 2003, in which the Examiner refused to enter the amendments that had been proposed and maintained his prior rejections of the claims.

A Request for Continued Examination was filed on December 2, 2003, with a request that the previously proposed claim amendments be entered.

Another Office Action on the merits followed on February 28, 2004. In that Office Action, some of the claim rejections were withdrawn and several new grounds for rejecting the claims were introduced.

In response, a third Amendment was mailed on May 28, 2004. Claims 21, 40, and 60 were amended. These were the last amendments presented in the '782 Application.

A second Final Office Action followed on August 18, 2004, in which the rejections of claims 1-60 were maintained.

A final attempt was made to convince the Examiner of the patentability of claims 1-26 in a document titled "Response to Final Office Action," which was filed on October 18, 2004.

An Advisory Action followed on November 10, 2004. In the Advisory Action, the Examiner maintained his previous rejections.

Therefore, a Notice of Appeal was filed in the above-referenced Application on November 18, 2004.

This Appeal Brief follows the Notice of Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The '782 Application includes claims that are directed to methods, systems, and apparatus for determining the identity of a semiconductor device by evaluating an identification mark that is covered by one or more material layers.

An identification method according to claims 1-20 of the '782 Application includes scanning electromagnetic radiation across an area of a substrate that includes at least one recess that forms part of an identification mark. Substitute Specification, paragraph **[0010]**. At least one wavelength of the electromagnetic radiation is capable of penetrating the layer of layers overlying the identification mark, which layer or layers are formed from material opaque to one or more other wavelengths of electromagnetic radiation. *See* paragraph **[0042]**. The intensities of radiation reflected from different locations of the area within which the identification mark is located are then measured. Paragraph **[0010]**. The locations at which the intensity of the reflected radiation differs from a baseline intensity are determined, and correlated to at least one characteristic which distinguishes one type of mark (*e.g.*, an alphanumeric character) from another. *Id.*

As recited in claims 21-40, the character of the identification mark may be used to identify a destination for a semiconductor device substrate that carried the identification mark. Paragraph **[0056]**.

Claims 41-59 of the '782 Application are drawn to a system for identifying a marking on a substrate through one or more material layers to determine a type of semiconductor device being fabricated upon the substrate. Paragraph **[0011]**. Such a system includes at least one radiation source, at least one reflectometer, and at least one processor. Paragraphs **[0011]**, **[0026]**. The at least one radiation source is configured and positioned to direct electromagnetic radiation toward the substrate. Paragraphs **[0011]**, **[0027]-[0030]**. At least one wavelength of the electromagnetic radiation is capable of at least partially penetrating material of the one or more layers that is substantially opaque to at least some wavelengths of electromagnetic radiation. Paragraphs **[0011]**, **[0029]**. The at least one reflectometer is positioned to receive electromagnetic radiation reflected from the substrate. Paragraphs **[0011]**, **[0031]**. The at least one processor is associated with the reflectometer in such a way as to facilitate analysis of a pattern of intensities of electromagnetic radiation of the at least one wavelength reflected from a plurality of locations of the substrate. Paragraphs **[0011]**, **[0033]**, **[0034]**, **[0055]**. Additionally, the at least one processor correlates the pattern of intensities to a known identifier associated with the marking, as well as to the type of semiconductor device fabricated on the substrate. Paragraphs **[0011]**, **[0036]**, **[0055]**.

Claims 59 and 60 recite a processor. The processor is programmed to characterize at least one material-covered recessed marking formed in a substrate and a type of semiconductor device being fabricated on the substrate. Paragraphs **[0011]**, **[0055]**. It compares a measured intensity of at least one wavelength of reflected radiation to a baseline intensity of the at least one wavelength of radiation reflected from a planar portion of the substrate. Paragraphs **[0011]**, **[0033]**, **[0034]**, **[0055]**. It also maps a plurality of locations of the substrate where the measured

intensity differs from the baseline intensity. Paragraphs **[0011]**, **[0036]**, **[0055]**. The resulting map comprises a digital image of the recessed marking. Once the marking has been mapped, the processor uses the marking to identify a corresponding type of semiconductor device. *See* paragraph **[0025]**.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

(A) Claims 21, 23, 32, 33, and 36-38 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by the disclosure of U.S. Patent 5,852,497 to Pramanik et al. (hereinafter "Pramanik");

(B) Claims 41 and 49-54 are rejected under 35 U.S.C. § 102(b) for being drawn to subject matter which is assertedly anticipated by the subject matter disclosed in U.S. Patent 5,361,150 to Noguchi (hereinafter "Noguchi");

(C) Claims 1-3 and 6-18 remain rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is allegedly unpatentable over teachings from Pramanik, in view of the subject matter taught in Noguchi;

(D) Claims 4, 5, 19, 20, 24, 25, 39, and 40 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over the subject matter taught in Pramanik, in view of teachings from Noguchi and, further, in view of the teachings of U.S. Patent 5,889,593 to Bareket (hereinafter "Bareket");

(E) Claims 42-48 and 55-58 are rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is purportedly unpatentable over teachings from Noguchi, in view of the subject matter taught in U.S. Patent 4,585,931 to Duncan et al. (hereinafter "Duncan"); and

(F) Claims 59 and 60 have both been rejected under 35 U.S.C. § 103(a) for reciting subject matter which is allegedly unpatentable over teachings from Bareket, in view of the subject matter taught in Noguchi.

VII. ARGUMENT

A. REJECTIONS UNDER 35 U.S.C. § 102

Claims 21, 23, 32, 33, 36-38, 41, and 49-54 stand rejected under 35 U.S.C. § 102.

1. APPLICABLE LAW

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

With respect to inherency, M.P.E.P. § 2112 provides:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic. *In re Rijckaert,* 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) . . . 'To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill . . .'' *In re Robertson,* 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1991).

2. REFERENCES RELIED UPON

Pramanik

Pramanik describes a process for locating or identifying conventional alignment marks on a substrate. Col. 1, lines 63-65; col. 10, lines 36-39. The alignment marks that are identified in the process of Pramanik comprise shallow trench isolation (STI) structures that are covered by one or more layers of opaque material. Col. 2, lines 60-63. The process of Pramanik is effected only after the substrate has been brought to a desired destination—a photolithography apparatus in which photoresist is selectively exposed to radiation. *See* col. 4, lines 10-26. When the positions of the alignment marks have been identified, one or both of the substrate and a reticle may be oriented to align the substrate and the reticle with one another. Col. 3, line 45; *see also* col. 1, lines 27-30.

Noguchi

Noguchi describes liquid crystal displays (LCDs) with identification marks. The identification mark of an LCD according to Noguchi includes a character pad 13 that is formed in or from an opaque thin film 7. Col. 4, lines 10-20. Noguchi clearly indicates that "no opaque thin film is laminated on the character pad 13" (col. 4, lines 51-54), with the possible exception of a reflective lower metal film 17, which apparently facilitates unimpeded, direct viewing from beneath the character pad 13 (*e.g.,* from location 12 of FIG. 6) through a transparent glass substrate 1 over which the character pad 13 is formed (*see* col. 4, lines 59-64). Instead of an opaque material, only transparent films (lower and upper insulating films 8 and 11) are laminated over the character pad 13. Col. 4, lines 54-64. Noguchi requires that these transparent films

have a light transmission factor of at least 90% for visible wavelengths of electromagnetic radiation (starting at about 350 nm). Col. 5, lines 16-18. According to Noguchi, the opacity of the film does not increase for higher wavelengths. *See id.* By ensuring that the character pad 13 is covered only with transparent materials, the identification mark formed thereby "can be visually viewed by a human being and by sensor devices." Col. 5, lines 9-12.

3. ANALYSIS

a. Pramanik – Claims 21, 23, 32, 33, and 36-38

Claims 21, 23, 32, 33, and 36-38 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by the disclosure of Pramanik.

Independent claim 21 recites a method for determining a destination of a semiconductor device substrate. That method includes identifying a mark that comprises at least one recess within a surface of the semiconductor device substrate, which mark is covered with at least one layer of material. Such identification includes scanning electromagnetic radiation over a plurality of locations of the substrate, detecting locations at which an intensity of the electromagnetic radiation changes from substantially a baseline intensity, and correlating each such location to identify the mark. Once the mark has been identified, a predetermined destination for the substrate may also be identified.

As noted above, Pramanik does not evaluate the STI structures for the purpose of determining the next destination for a wafer or other semiconductor device structure. Rather, in the method of Pramanik, the wafer is already at the desired destination when the orientations of the STI structures are determined. Once the orientations of the STI structures have been

determined, the wafer may be finely aligned so that a mask may be accurately and precisely positioned over the wafer. *See* col. 1, lines 27-30.

As Pramanik does not expressly or inherently describe that the STI structures that may be viewed in accordance with the method disclosed therein may be to identify a destination for a wafer or other semiconductor device structure, Pramanik includes no express or inherent description of identifying a predetermined destination for a semiconductor device substrate based on an identity of a mark.

Therefore, Pramanik does not anticipate each and every element of independent claim 21. It is, therefore, respectfully submitted that, under 35 U.S.C. § 102(b), independent claim 21 is allowable over Pramanik.

Each of claims 23, 32, 33, and 36-38 is allowable, among other reasons, as depending either directly or indirectly from claim 21, which is allowable.

b. Noguchi – Claims 41 and 49-54

Claims 41 and 49-54 stand rejected under 35 U.S.C. § 102(b) for being drawn to subject matter which is assertedly anticipated by the subject matter disclosed in Noguchi.

Independent claim 41 is drawn to a system for identifying a marking on a substrate indicative of a type of semiconductor device being fabricated on the substrate, which marking is at least partially covered by at least one layer of material. The system of independent claim 41 includes, among other things, at least one radiation source configured and positioned to direct electromagnetic radiation of at least one wavelength toward a substrate, the at least one wavelength capable of at least partially penetrating a material that is substantially opaque to at

least some wavelengths of electromagnetic radiation. In addition, the system of independent claim 41 includes at least one reflectometer positioned so as to receive electromagnetic radiation of the at least one wavelength reflected from a location of the substrate covered with the material that is substantially opaque to at least some wavelengths of electromagnetic radiation.

Noguchi lacks any express description of a sensor device that includes a radiation source which is configured and positioned to direct, toward a substrate, electromagnetic radiation of at least one wavelength capable of at least partially penetrating a material that is substantially opaque to at least some wavelengths of electromagnetic radiation.

As the character pad 13 of Noguchi may be "visually viewed by a human being and by sensor devices" (col. 5, lines 9-12), there is no requirement in Noguchi that sensor devices that are used to detect a marking formed by the character pad 13 include a radiation source configured and positioned to direct, toward a substrate, electromagnetic radiation of at least one wavelength capable of at least partially penetrating a material that is substantially opaque to at least some wavelengths of electromagnetic radiation. Therefore, Noguchi also lacks any inherent description of a system with a radiation source configured and positioned to direct, toward a substrate, electromagnetic radiation of at least one wavelength "capable of at least partially penetrating a material substantially opaque to at least some wavelengths of electromagnetic radiation . . ."

As the disclosure provided by Noguchi does not expressly or inherently describe each and every element of independent claim 41, it is respectfully submitted that Noguchi does not anticipate each and every element of independent claim 41, as would be required to maintain the 35 U.S.C. § 102(b) rejection of independent claim 41.

Each of claims 49-54 is allowable, among other reasons, for depending either directly or indirectly from claim 41, which is allowable.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 21, 23, 32, 33, 36-38, 41, 49-54 be reversed.

A. REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 1-20, 22, 24-31, 34, 35, 39, 40, 42- 48, and 55-60 have been rejected under 35 U.S.C. § 103(a).

1. APPLICABLE LAW

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. ADDITIONAL REFERENCES RELIED UPON

Bareket

Bareket teaches an optical system and methods. The optical system of Bareket includes an angle-dependent reflectometer with multiple detection elements for detecting radiation which is reflected at different angles. Col. 3, lines 51-67. In addition, that system includes a processing system that acquires and analyzes data of the detected, reflected radiation. Col. 3, line 67, to col. 4, line 7. The system of Bareket is useful for optically inspecting semiconductor wafers, including the widths of conductive lines or other "periodic text patterns" on the surfaces of the semiconductor wafers. *See, e.g.,* Abstract, col. 4, lines 4-10; col. 7, line 59, to col. 8, line 8.

Duncan

The teachings of Duncan relate to the use of bar codes to identify semiconductor wafers.

3. ANALYSIS

a. Pramanik in View of Noguchi – Claims 1-3 and 6-18

Claims 1-3 and 6-18 stand rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is allegedly unpatentable over teachings from Pramanik, in view of the subject matter taught in Noguchi.

It is respectfully submitted that there is at least one reason that a *prima facie* case of obviousness has not been established against any of claims 1-3 and 6-18. In particular, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to

combine the teachings of Pramanik and Noguchi in the manner that has been asserted. This is because Noguchi teaches away from the subject matter taught in Pramanik, as well as that recited in claims 1-3 and 6-18. While the teachings of Pramanik and claims 1-3 and 6-18 are directed to techniques which include visualizing STI features (Pramanik) or characters (claims 1-3 and 6-18) through at least one layer of material which is opaque to at least some wavelengths of electromagnetic radiation, Noguchi clearly teaches limiting the layers that cover a marking to visibly transparent materials so that the markings can be visually detected. Col. 4, line 48, to col. 5, line 12.

Since Noguchi teaches away from the asserted combination, as well as from the subject matter recited in claims 1-3 and 6-18, it is apparent that the only way one of ordinary skill in the art would have been motivated to combine the teachings of Pramanik and Noguchi would have been through improper hindsight afforded by the disclosure and claims of the above-referenced application.

Therefore, it is respectfully submitted that a *prima facie* case of obviousness has not been established against any of claims 1-3 or 6-18. Accordingly, it is respectfully submitted that, under 35 U.S.C. § 103(a), each of these claims recites subject matter which allowable over Pramanik and Noguchi.

b. Pramanik, Noguchi, and Bareket – Claims 4, 5, 19, 20, 24, 25, 39, and 40

Claims 4, 5, 19, 20, 24, 25, 39, and 40 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over the subject matter taught in Pramanik, in view of teachings from Noguchi and, further, in view of the teachings of Bareket.

Each of claims 4, 5, 19, 20, 24, 25, 39, and 40 is allowable since Bareket does not remedy the fact that Noguchi teaches away from the combination thereof with Pramanik, as well as from the subject matter recited in claims 4, 5, 19, 20, 24, 25, 39, and 40.

Claims 4, 5, 19, and 20 are also allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Each of claims 24, 25, 39, and 40 is also allowable, among other reasons, for depending either directly or indirectly from claim 21, which is allowable.

c. Noguchi in View of Duncan – Claims 42-48 and 55-58

Claims 42-48 and 55-58 are rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is purportedly unpatentable over teachings from Noguchi, in view of the subject matter taught in Duncan.

Each of claims 42-48 and 55-58 is allowable, among other reasons, for depending either directly or indirectly from claim 41, which is allowable.

d. Bareket in View of Noguchi – Claims 59 and 60

Claims 59 and 60 have both been rejected under 35 U.S.C. § 103(a) for reciting subject matter which is allegedly unpatentable over teachings from Bareket, in view of the subject matter taught in Noguchi.

Independent claim 59 is directed to a processor for characterizing at least one material-covered recessed marking formed in a substrate and a type of semiconductor device being fabricated on the substrate. The processor of independent claim 59 includes at least one logic circuit for comparing a measured intensity of at least one wavelength of reflected radiation to a baseline intensity of the at least one wavelength of radiation reflected from a planar portion of the substrate, as well as at least one logic circuit for mapping a plurality of locations of the substrate where the measured intensity differs from the baseline intensity. The resulting map comprises a digital image of the recessed marking. The processor of independent claim 59 also includes at least one logic circuit for identifying a type of semiconductor device that corresponds to the mapped locations.

It is respectfully submitted that a *prima facie* case of obviousness has not been established against amended independent claim 59 for at least two reasons.

First, it is respectfully submitted that neither Bareket nor Noguchi teaches or suggests a processor which is configured to compare a measured intensity of at least one wavelength of reflected radiation to a baseline intensity of the at least one wavelength of radiation reflected from "a planar portion of the substrate" and, based upon such comparison, to map locations where the baseline intensity and the measured intensity differ from one another. Instead, the

teachings of both Bareket and Noguchi are limited to conventional optical recognition systems, in which it is not necessary to use a "planar portion of [a] substrate" as a reference point.

Second, since neither Bareket nor Noguchi teaches or suggests a logic circuit which is configured to map a plurality of locations on a substrate where a measured intensity differs from a baseline intensity at a planar region of a substrate to generate a digital image of a recessed marking formed in the substrate, neither of these references could motivate one of ordinary skill in the art to develop a processor with such a logic circuit.

Therefore, it is respectfully submitted that, under 35 U.S.C. § 103(a), amended independent claim 59 is allowable over the combination of Bareket and Noguchi.

Claim 60 is allowable, among other reasons, for depending from claim 59, which is allowable.

VIII. CLAIMS APPENDIX

The current status of each claim that has been introduced into the above-referenced application is set forth in CLAIMS APPENDIX to this Appeal Brief.

IX. EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132. Accordingly, no evidence appendix accompanies this Appeal Brief.

X. RELATED PROCEEDINGS APPENDIX

No decisions have been rendered by the Board or any court in a related application. Therefore, this Appeal Brief is not accompanied by a related proceedings appendix.

XI. CONCLUSION

It is respectfully submitted that:

(A) Each of claims 21, 23, 32, 33, and 36-38 is allowable under 35 U.S.C. § 102(b) for reciting subject matter which is novel over the subject matter disclosed in Pramanik;

(B) Claims 41 and 49-54 are allowable under 35 U.S.C. § 102(b) for being drawn to subject matter which is not anticipated by the subject matter disclosed in Noguchi;

(C) Claims 1-3 and 6-18 are allowable under 35 U.S.C. § 103(a) for being directed to subject matter which is patentable over teachings from Pramanik and Noguchi;

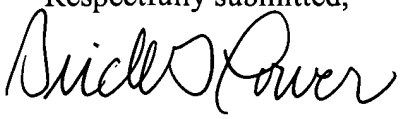
(D) Each of claims 4, 5, 19, 20, 24, 25, 39, and 40 is allowable under 35 U.S.C. § 103(a) for reciting subject matter which is patentable over the subject matter taught in Pramanik, in view of teachings from Noguchi and Bareket;

(E) Claims 42-48 and 55-58 are each allowable under 35 U.S.C. § 103(a) for being directed to subject matter which is nonobvious in view of teachings from Noguchi and Duncan; and

(F) Claims 59 and 60 are both allowable under 35 U.S.C. § 103(a) for reciting subject matter which is patentable over teachings from Bareket and Noguchi.

Accordingly, the rejections of claims 1-60 should be reversed, and each of these claims should be allowed.

Respectfully submitted,



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BGP/rmh
Document in ProLaw

CLAIMS APPENDIX

1. A method for identifying a type of semiconductor device being fabricated on a substrate by evaluating a mark comprising at least one recess in the substrate surface through at least one layer formed over the mark, comprising:

scanning electromagnetic radiation of at least one wavelength across at least a portion of the substrate including the at least one recess, the at least one wavelength capable of at least partially penetrating a material substantially opaque to at least some wavelengths of electromagnetic radiation;

measuring an intensity of radiation of the at least one wavelength reflected by different locations of the at least a portion of the substrate;

detecting locations at which the intensity changes from substantially a baseline intensity; and

correlating each location at which the intensity changes to at least one characteristic which distinguishes the mark from other marks on or in the substrate and to identify the type of semiconductor device being fabricated on the substrate.

2. The method of claim 1, wherein scanning comprises raster scanning the electromagnetic radiation.

3. The method of claim 1, wherein scanning is effected over at least a portion of a wafer comprising semiconductor material where the mark is located.

4. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation comprising a plurality of wavelengths across at least the portion of the substrate.

5. The method of claim 4, wherein measuring comprises measuring intensities of reflected radiation of each of the plurality of wavelengths.

6. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 100 nm to about 1,000 nm across the at least a portion of the substrate.

7. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 190 nm to about 800 nm across the at least a portion of the substrate.

8. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of a wavelength of at least about 140 nm across the at least a portion of the substrate.

9. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 220 nm to about 800 nm across the at least a portion of the substrate.

10. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 300 nm to about 780 nm across the at least a portion of the substrate.

11. The method of claim 1, wherein scanning comprises scanning electromagnetic radiation of a wavelengths of about 550 nm across at the least a portion of the substrate.

12. The method of claim 1, wherein scanning is effected from above the substrate.

13. The method of claim 1, wherein scanning is effected at a non-perpendicular angle relative to the substrate.

14. The method of claim 1, wherein scanning comprises moving a source of the electromagnetic radiation relative to the substrate.

15. The method of claim 1, wherein scanning comprises moving the substrate relative to a source of the electromagnetic radiation.

16. The method of claim 1, wherein measuring the intensity is effected using a reflectometer.

17. The method of claim 1, wherein detecting comprises identifying a location of the substrate from which the electromagnetic radiation was reflected.

18. The method of claim 1, wherein detecting comprises identifying a location of the substrate to which the electromagnetic radiation was directed.

19. The method of claim 1, wherein correlating comprises mapping at least each location at which the intensity of electromagnetic radiation reflected from the substrate varied from the baseline intensity.

20. The method of claim 19, wherein correlating further comprises recognizing the mark based at least in part on mapping.

21. A method for determining a destination for a semiconductor device substrate, comprising:

identifying a mark comprising at least one recess within a surface of the semiconductor device substrate and covered with at least one layer of material substantially opaque to at least some wavelengths of electromagnetic radiation by:

scanning electromagnetic radiation of at least one wavelength across at least a portion of the semiconductor device substrate including the at least one recess, the at least one wavelength capable of at least partially penetrating the material;

measuring an intensity of radiation of the at least one wavelength reflected by different locations of the at least a portion of the semiconductor device substrate;

detecting locations at which the intensity changes from substantially a baseline intensity; and

correlating each location at which the intensity changes to identify the mark; and identifying a predetermined destination for the semiconductor device substrate based on the mark.

22. The method of claim 21, wherein scanning comprises raster scanning the electromagnetic radiation.

23. The method of claim 21, wherein scanning is effected over at least a portion of the semiconductor device substrate comprising semiconductor material where the mark is located.

24. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation comprising a plurality of wavelengths across at least the portion of the semiconductor device substrate.

25. The method of claim 24, wherein measuring comprises measuring intensities of reflected radiation of each of the plurality of wavelengths.

26. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 100 nm to about 1,000 nm across the at least a portion of the semiconductor device substrate.

27. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 190 nm to about 800 nm across the at least a portion of the semiconductor device substrate.

28. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of a wavelength of at least about 140 nm across the at least a portion of the semiconductor device substrate.

29. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 220 nm to about 800 nm across the at least a portion of the semiconductor device substrate.

30. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of wavelengths of about 300 nm to about 780 nm across the at least a portion of the semiconductor device substrate.

31. The method of claim 21, wherein scanning comprises scanning electromagnetic radiation of a wavelength of about 550 nm across the at least a portion of the semiconductor device substrate.

32. The method of claim 21, wherein scanning is effected from above the semiconductor device substrate.

33. The method of claim 21, wherein scanning is effected at a non-perpendicular angle relative to the semiconductor device substrate.

34. The method of claim 21, wherein scanning comprises moving a source of the electromagnetic radiation relative to the semiconductor device substrate.

35. The method of claim 21, wherein scanning comprises moving the semiconductor device substrate relative to a source of the electromagnetic radiation.

36. The method of claim 21, wherein measuring the intensity is effected using a reflectometer.

37. The method of claim 21, wherein detecting comprises identifying a location of the semiconductor device substrate from which the electromagnetic radiation was reflected.

38. The method of claim 21, wherein detecting comprises identifying a location of the semiconductor device substrate to which the electromagnetic radiation was directed.

39. The method of claim 21, wherein correlating comprises mapping at least each location at which the intensity of electromagnetic radiation reflected from the semiconductor device substrate varied from the baseline intensity.

40. The method of claim 39, wherein correlating further comprises recognizing the mark based at least in part on the mapping.

41. A system for identifying a marking on a substrate indicative of a type of semiconductor device being fabricated on the substrate and at least partially covered by at least one layer of material, comprising:

at least one radiation source configured and positioned to direct electromagnetic radiation of at least one wavelength toward a substrate, the at least one wavelength capable of at least partially penetrating a material substantially opaque to at least some wavelengths of electromagnetic radiation;

at least one reflectometer positioned so as to receive electromagnetic radiation of the at least one wavelength reflected from a location of the substrate covered with a material substantially opaque to at least some wavelengths of electromagnetic radiation; and

at least one processor associated with the reflectometer for analyzing a pattern of intensities of electromagnetic radiation of the at least one wavelength reflected from a plurality of

locations of the substrate and for correlating the pattern of intensities to a known identifier associated with the marking and to the type of semiconductor device being fabricated on the substrate.

42. The system of claim 41, wherein the at least one processor includes at least one logic circuit for comparing the intensity of the at least one wavelength of radiation reflected from the location of the substrate to a baseline intensity, the logic circuit being under control of at least a portion of at least one program.

43. The system of claim 42, wherein the at least one logic circuit for comparing the intensity also effects storing in memory at least one location of the substrate where the intensity of the at least one wavelength of radiation reflected from the substrate varies from the baseline intensity.

44. The system of claim 43, wherein the at least one processor includes at least one logic circuit for mapping at least locations of the substrate where an intensity of the at least one wavelength of reflected electromagnetic radiation varies from the baseline intensity, the at least one logic circuit for mapping being under control of at least a portion of at least one program.

45. The system of claim 44, wherein the at least one processor includes at least one logic circuit for identifying the surface feature based on a mapped plurality of locations where an intensity of the at least one wavelength of reflected electromagnetic radiation varies from the

baseline intensity, the at least one logic circuit for identifying being under control of at least a portion of at least one program.

46. The system of claim 41, further comprising an actuation apparatus for effecting movement of at least one of the substrate and the at least one radiation source.

47. The system of claim 41, wherein the at least one radiation source is configured to direct incident radiation of a plurality of wavelengths onto at least a portion of the substrate.

48. The system of claim 47, wherein the at least one reflectometer is configured to measure intensities of reflected radiation of each of the plurality of wavelengths.

49. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of wavelengths of about 100 nm to about 1,000 nm.

50. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of wavelengths of about 190 nm to about 800 nm.

51. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of a wavelength of at least about 140 nm.

52. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of wavelengths of about 220 nm to about 800 nm.

53. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of wavelengths of about 300 nm to about 780 nm.

54. The system of claim 41, wherein the at least one radiation source is configured to emit incident radiation of a wavelength of about 550 nm.

55. The system of claim 41, wherein the at least one radiation source is positioned to emit incident radiation toward an active surface of the substrate.

56. The system of claim 41, wherein the at least one radiation source is positioned to emit incident radiation toward an active surface of the substrate at a non-perpendicular angle thereto.

57. The system of claim 41, further comprising a user interface associated with the at least one processor.

58. The system of claim 41, further comprising at least one output device associated with the at least one processor.

59. A processor for characterizing at least one material-covered recessed marking formed in a substrate and a type of semiconductor device being fabricated on the substrate, comprising:

at least one logic circuit for comparing a measured intensity of at least one wavelength of reflected radiation to a baseline intensity of the at least one wavelength of radiation reflected from a planar portion of the substrate; and

at least one logic circuit for mapping a plurality of locations of the substrate where the measured intensity differs from the baseline intensity, the at least one logic circuit being under control of at least a portion of at least one program, a map resulting from the mapping comprising a digital image of the recessed marking; and

at least one logic circuit for identifying a type of semiconductor device that corresponds to the mapped locations.

60. The processor of claim 59, further comprising:

at least one logic circuit for characterizing the at least one material-covered recess based on the plurality of locations mapped by the at least one logic circuit for mapping, the at least one logic circuit for characterizing being under control of at least a portion of at least one program.